

# TYPHOON ALICE (01)

Typhoon Alice, the first tropical cyclone of the 1979 season, was actually first sighted as a tropical disturbance on the 27th of December 1978. Being over the Gilbert Islands quite close to the equator, the potential for development was considered poor. A tropical cyclone formation alert was issued at 0300Z 1 January 1979 when satellite data showed the disturbance progressively increasing in organization. Soon after, the suspect area accelerated northwest to higher latitudes where development conditions were more favorable, and by 011800Z, tropical storm Alice was named. Post-analysis showed that the tropical depression stage began near 010000Z at low latitudes, contrary to the general rule that cyclones do not form close to the equator.

Although a climatologically unfavorable period for western North Pacific tropical cyclone development, the fact that Alice did form supports the non-existence of a definitive "typhoon season" for WESTPAC; tropical cyclones are possible anytime of the year. The greatest forecasting difficulties and concomitant large forecast errors occurred during Alice's formative and dissipating stages. Double intensification also contributed to Alice's notoriety.

Early in her lifetime, Alice meandered through the Marshall Islands as if determined to visit each island. One week later, on 12 January 1979, President Carter declared the Marshall Islands a major disaster area.

A satellite reconnaissance fix at 022133Z showed Alice had moved northeastward when forecast to continue northwestward. Being a fix on a poorly defined satellite image (PCN 6), it was not taken verbatim; northwest movement continued to be forecast. An aircraft reconnaissance fix at 030053Z confirmed the earlier satellite fix as did a follow-on 030310Z aircraft fix. Post-analysis revealed that a mid-latitude, short-wave trough passed north of Alice during this time period. The trough extended deep enough into the tropics to weaken the mid-tropospheric ridge. This weakness permitted a southward intrusion of mid-latitude westerlies into Alice's vicinity, temporarily steering her northeastward. As the short-wave trough continued eastward, the subtropical ridge quickly reestablished itself north of Alice producing strong easterly steering flow, temporarily accelerating her from 4 to 10 kt (8 to 19 km/hr) toward the northwest when continued northeast movement was forecast. During this time, decision makers on Eniwetok (also within the Marshall Islands), noting the low forecast confidence stated on prognostic reasoning messages, kept a condition of readiness which paid off.

From the 6th to the 11th, Alice traveled due west. On the 8th, Alice attained 110 kt (57m/sec) intensity and simultaneously accelerated to a speed of 14 kt (26 km/hr) (the fastest observed along track), whereupon she began weakening slowly.

During the 9th, Alice began an unexpected northward movement trend and showed further weakening. Post-analysis of low-level synop-

tic data and satellite imagery (Fig. 3-01-1) indicated that an approaching frontal shear-line was the responsible agent. The shear-line began interacting with Alice while she was southeast of Guam. As Alice neared Guam, radar data from Andersen AFB and aircraft data indicated that Alice's previously well-defined wall cloud became larger and somewhat less organized. Cooler, drier air north of the shear-line was likely responsible for this weakening trend. A weakness in the subtropical ridge vertically above the shear-line apparently allowed for Alice's northward deviation.

The most unusual portion of Alice's track occurred during the final 3 days of Alice's life. Based on interpretation of PE progs, the subtropical ridge was expected to persist and maintain Alice in the easterlies. As a result, the JTWC forecasts (supported by the majority of objective forecast aids) indicated westward movement until 120000Z, 18 hours after Alice had actually begun tracking northwestward. The subtropical ridge weakened in response to a long-wave trough deepening over eastern Asia. Easterly steering currents in Alice's vicinity diminished and veered in direction, permitting a more northward track. Alice reached a secondary intensity maximum of 100 kt (51 m/sec) during this period due to her slowing in speed of movement, the increased absolute vorticity of higher latitudes and good outflow aloft.

By the 13th, Alice turned northeastward and began weakening rapidly. The subtropical ridge was now completely severed and upper-air westerlies were shearing Alice significantly in the vertical. Close proximity of yet another frontal shear-line contributed to further weakening. The biggest surprise, however, came when Alice's low-level circulation turned almost 180 degrees back toward the west at about 131200Z under the influence of strong, low-level easterlies and weakened rapidly in the strong, vertical-shear environment. As a result of vertical decoupling, Alice as a shallow depression, dissipated during the following 12-hour period.

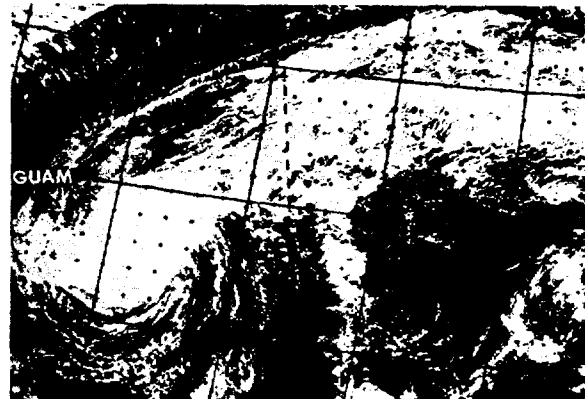


FIGURE 3-01-1. Typhoon Alice merging with the trailing end of a frontal shear-line, 9 January 1979, 0054Z. [DMSP imagery]